IN THE SPECIFICATION:

At page 11, please replace paragraph [0039] with the following amended paragraph:

[0039]   Figure 3 is a graph 300 of a plurality of exemplary normalized impedance curves for a target with varying material characteristics. Such a target may be, for example, a precision wheel fabricated from 4140 steel with a circumferentially varying chrome thickness from zero mils to fourteen mils plated over the 4140 steel base wheel, such that the resulting wheel is substantially perfectly round in cross-section. In the exemplary embodiment, target 30 (shown in figure 1) was positioned at different gap distances 29 at a radial of a chrome thickness then sequentially repositioned to radials of different chrome thicknesses. Recording a transducer impedance at each position of gap versus radial yields a plurality of curves 302 that relate to material property differences of target 30. In the exemplary embodiment, curves 302 are substantially similar to curves 162 (shown in Figure 2) that relate to varying the excitation frequency of ~~transducer 30~~ transducer 12.

At page 12, please replace paragraph [0041] with the following amended paragraph:

[0041]   Figure 4 is a cross-sectional diagram of an exemplary chrome plated wheel 400 that may be used with ~~system 100~~ system 10 (shown in Figure 1) to illustrate the effects of varying material properties on measured gap distance. Wheel 400 includes a body 402 fabricated from 4140 steel and a varying thickness coating 404 of chrome. At a first radial 406, a thickness 408 of chrome is zero mils. At a second radial 410, a thickness 412 of chrome is fourteen mils. Between first radial 406 and second radial 410 the thickness of chrome plate varies substantially proportionally with circumferential distance from radials 406 and 410.

At page 12, please replace paragraph [0042] with the following amended paragraph:

[0042]   Figure 5 is an exemplary graph 500 of an output of transducer 12 illustrating the effects of a varying material property of wheel 400 on measured gap. In the exemplary embodiment, wheel 400 was rotated proximate transducer 12 such that transducer 12 was positioned normal to the chrome plated surface of wheel 400. An x-axis 502 is a time-base scale in milliseconds that may be used to correlate the thickness of the chrome plate on rotating wheel 400 as measured by transducer 12. A y-axis 504 is scaled in measured mils of gap between transducer 12 and rotating wheel 400. Although the actual gap between wheel 400 and transducer 12 was substantially constant at thirty-four mils, the measured gap varies widely due the effects of the varying material properties of rotating wheel 400. Graph 500 includes an ~~uncompensated trace 502~~ uncompensated trace 506 that illustrates the output of transducer 12 when the gap between transducer 12 and wheel 400 is a constant approximately thirty-four mils with no intentional correction for the varying material properties of rotating wheel 400. Graph 500 also includes a trace 508 that illustrates the output of transducer 12 when the gap between transducer 12 and wheel 400 is a constant approximately thirty-four mils using a non-linear 3D curve fit to facilitate reducing the run out due to the varying material properties of rotating wheel 400. Uncompensated run out is approximately twenty-five mils, whereas the compensated run out is approximately ten mils.

At page 13, please replace paragraph [0044] with the following amended paragraph:

[0044]   In the exemplary embodiment, there are five main steps to determining linear projections to interpolate impedance values to corresponding to the gap between transducer 12 and target 30 and/or the material properties of target 30. These steps assume a data structure with data points that are relative to a predetermined target property, such as, a set of normalized impedance curves has been populated and is accessible to system 10. In the exemplary embodiment, the data structure that includes the normalized impedance curves is a look-up table. In an alternative embodiment, the data structure includes the normalized impedance curves in a mathematical algorithm. A data point 622 represents a normalized

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impedance value of transducer 12 when the output is sampled as described above while ~~wheel 402~~ wheel 400 is rotating with transducer 12 positioned proximate coating 404. The steps interpolation using linear projection include:

> 1) Select a plurality of data points 624, 626, 628, and 630 that data point 622 reading falls between, such that the impedance values of data points 624, 626, 628, and 630 may be determined.

> 2) Connect adjacent data points 624 and 626, 626 and 628, 628 and 630, and 630 and 624 such that the resulting line segments 632, 634, 636, and 638 define a box enclosing data point 622.

> 3) Determine the minimum distance from each segment 632, 634, 636, and 638 to data point 622, such that the minimum distance is represented by a respective line segment 640, 642, 644, and 646 that is normal to each corresponding line segment 632, 634, 636, and 638 .

> 4) Determine a point of intersection 648, 650, 652, and 654 of each pair of the minimum distance line segments 640, 642, 644, and 646 and the corresponding selected data point connecting line segments 632, 634, 636, and 638.

> 5) Interpolate to determine the gap and the target material property of interest based on the interpolated values of points of intersection.

At page 14, please replace paragraph [0046] with the following amended paragraph:

[0046]   Figure 7 is a graph 700 of an output of system 10 using the linear projection interpolation algorithm described above. Graph 700 includes a plurality of data points 702 that define a response of system 10 to ~~wheel 402~~ wheel 400 rotating proximate to transducer 12 such that gap 29 was established at 34 mils. Each data point 702 correlates a gap output of system 10 to the chrome plate coating thickness of ~~wheel 402~~ wheel 400 as ~~wheel 402~~ wheel 400 rotates proximate transducer 12. Graph 700 includes a x-axis 704 that represents a thickness of chrome plate coating on ~~wheel 402~~ wheel 400 when each associated data point was sampled, and an y-axis 706 that represents the gap value measured by system 10 using the linear projection interpolation algorithm. The output data points 702 of system 10 using the linear projection interpolation algorithm may be compared to the output of system 10 using a non-linear 3D curve fit (trace 508 in Figure 5) and the uncompensated output of

system 10 (trace 506 in Figure 5). In each case, the actual gap between transducer 12 and ~~wheel 402~~ wheel 400 is a constant 34 mils. The variation of the data point amplitudes illustrated in Figures 5 and 7 is due to the material properties, such as chrome plate thickness, of ~~wheel 402~~ wheel 400. The linear projections calculation illustrated in Figure 7 has significantly less run out than both the uncompensated method (trace 506 in Figure 5) and the non-linear 3D curve fit method (trace 508 in Figure 5). The runout using the linear projections calculation illustrated in Figure 7 is approximately two mils, which is an approximately eighty percent reduction compared to the non-linear 3D curve fit method (shown in Figure 5) and an approximately ninety two percent reduction compared to the uncompensated method.